10

11

19 NETWORK

13

16

CAMERA OR
VIDEO SOURCE

18

SCANNER

CPU

TO CPU

14

PRINTER

20

17

12

Fig. 1

```
BEGIN ── 100

SELECT PICTURE IMAGE TO BE PROCESSED ── 110

SELECT TRIM INFORMATION ── 120

MERGE TRIM INFORMATION INTO ── 130
PICTURE IMAGE DATA

PRINT PICTURE IMAGE WITH TRIM INFORMATION
EMBEDDED INVISIBLY THROUGHOUT THE PICTURE IMAGE ── 140

END
```

Fig. 2

Figure 3

Figure 4

Figure 5

Figure 6

$X_{cut} \rightarrow$

Algorithm applied:

$$x_{cut} = x_1 + x_2$$
$$y_{cut} = y_1 + y_2.$$
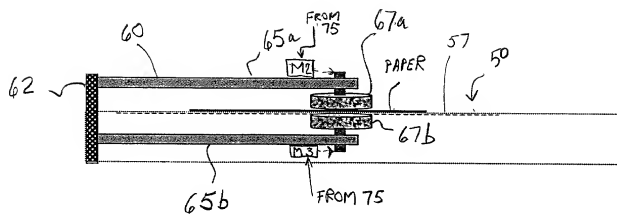
centered on the crosshairs

$\uparrow$
Y_{cut}
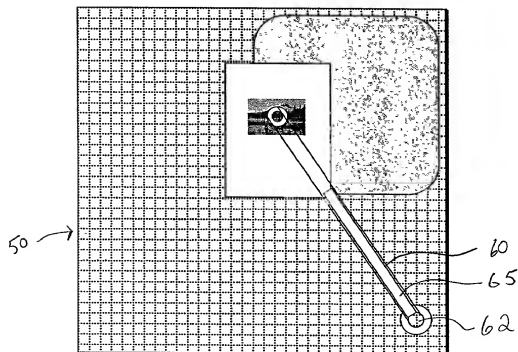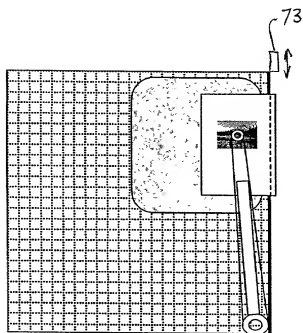
Figure 7

Figure 8a
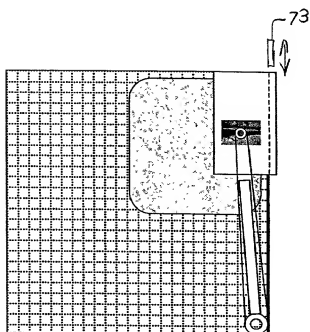Head translation & rotation to first edge cut

Figure 8b
180 deg rotation to second edge cut
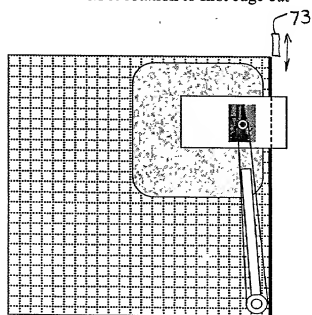

Figure 8c
Head translation and 90 deg rotation to
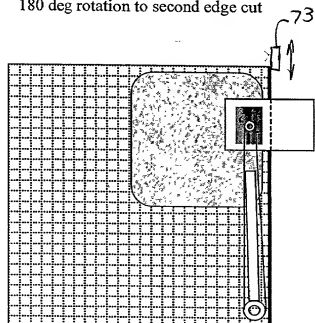third edge cut

Figure 8d
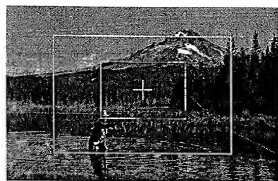180 deg rotation to last edge cut

Figure 8e
Finished cut

edge to be cut
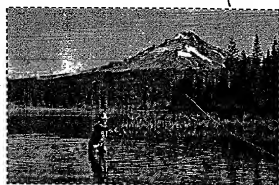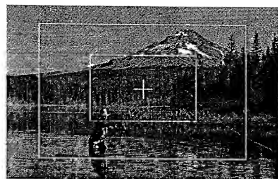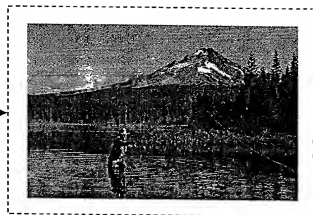
Fig. 9 a   Normal Cut   Fig 9 b

Fig 10a   Half-inch Border Cut   Fig 10 b
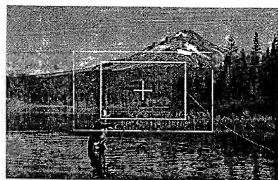

Fig. 11a   Center Crop   Fig. 11 b

```
  ( BEGIN )
      │
      ▼
┌─────────────────────────────────────┐
│ CAMERA SENSOR VIEWS CUTTING BOARD AREA │─── 205
└─────────────────────────────────────┘
      │
      ▼
┌───────────────────────────────┐
│ PROCESS PICTURE INFORMATION   │── 210
└───────────────────────────────┘
      │
      ▼
┌───────────────────────────────┐
│ IDENTIFY ROWS AND COLUMNS OF  │── 213
│ ICON INFORMATION FROM CODE IN PICTURE │
└───────────────────────────────┘
      │
      ▼
┌───────────────────────────────┐
│ DETERMINE ICON'S CENTER       │── 215
│ IN REAL DIMENSIONS            │
└───────────────────────────────┘
      │
      ▼
┌───────────────────────────────┐
│ MOVE ROTATING HEADS TO ICON   │── 217
│ CENTER AND CLAMP ON PICTURE   │
└───────────────────────────────┘
      │
      ▼
┌───────────────────────────────┐
│ DETERMINE SPACING OF ICON CENTER │── 220
│ FROM CUTTING EDGE FOR FIRST CUT │
└───────────────────────────────┘
      │
      ▼
┌─────────────────────────────────────┐
│ PIVOT AND TRANSLATE ROTATING HEADS   │── 225
│ TO POSITION ICON CENTER AT CORRECT SPACING │
│ FROM CUTTING EDGE FOR FIRST CUT      │
└─────────────────────────────────────┘
      │
      ▼
┌───────────────────────────────┐
│ ROTATE ROTATING HEADS ABOUT   │── 230
│ THEIR CENTER TO ADJUST ANGULAR │
│ ORIENTATION OF RECTANGULAR ICON │
│ RELATIVE TO CUTTING EDGE       │
└───────────────────────────────┘
      │
      ▼
    ( A )
```

Fig 12A

Fig. 12A

Fig. 12B

Fig 12

(A)

TRIM FIRST EDGE — 235

ROTATE ROTATING HEADS 180 DEGREES — 240
ABOUT THEIR CENTER TO ADJUST RECTANGULAR
ICON RELATIVE TO CUTTING EDGE

TRIM SECOND EDGE — 245

DETERMINE SPACING OF ICON CENTER FROM — 250
CUTTING EDGE FOR THIRD CUT

PIVOT AND TRANSLATE ROTATING HEADS — 255
TO ADJUST SPACING OF ICON CENTER FROM THE
CUTTING EDGE FOR THIRD CUT

ROTATE ROTATING HEADS ABOUT THEIR — 260
CENTER TO ADJUST ANGULAR ORIENTATION OF
RECTANGULAR ICON RELATIVE TO CUTTING EDGE

TRIM THIRD EDGE — 265

ROTATE ROTATING HEADS 180 DEGREES ABOUT — 270
THEIR CENTERS TO ADJUST RECTANGULAR ICON
RELATIVE TO CUTTING EDGE

TRIM FOURTH EDGE — 275

END

Fig. 12B

Fig. 13

4" x 6"

3.5" x 5"

6" x 6" with .5" border

3" x 5" with .5" border

5" x 7" with 1" border

4" x 6"

3.5 " x 5"

4" x 6"

Fig. 14

Plural Images on a Page:
Printer Set-up, Using Final Cut Sizes
For Optimization

310

Acquire input
Image "A"

~ 320

Acquire image
"A" cutting
information

Loop to
obtain next
image

Merge cutting
information
into image "A"

330

Store new
image "A" in
buffer

340

Identify buffer
images by final
cut size

350

Pack images
into "electronic
layout" page

360

Apply algorithm to achieve most
efficient print medium usage and
avoid 'dead-end' cuts, using final
cut sizes of images

380

Print
optimized
layout page

370

Fig. 15

Plural Images on a Page:

Cutting

```
┌─────────────────┐
│ Physically acquire │ ～ 410
│ page with plural  │
│     images        │
└─────────────────┘
         │
         ▼
┌─────────────────┐
│ Scan entire page  │ ～ 420
│ with solid state  │
│     camera        │
└─────────────────┘
         │
         ▼
┌─────────────────┐   ～ 430                    450
│    Determine      │◄┄┄┄                      ／
│ number of images, │     ┄┄┄┐    ┌────────────────────┐
│ centers & cut-lines│        ╲  │ Use software algorithm to │
└─────────────────┘      ╲ │ avoid cutting across other │
         │             ╲│     image cut-lines      │
         ▼          ┄┄┄►└────────────────────┘
┌─────────────────┐ ┄┄
│ Prioritize/sequence │◄┄
│     cut-lines      │
└─────────────────┘  ～ 440
         │
         ▼
┌─────────────────┐  ─ 450
│    Cut page       │
│  according to     │
│    sequence       │
└─────────────────┘
```
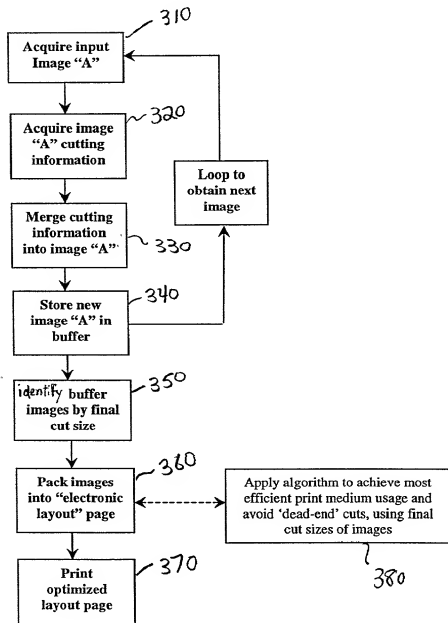
Fig. 16